

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (Currently Amended): An apparatus for performing color conversion with reference to a profile defining correspondence between colorimetric value data and ink amount data, comprising:

a profile memory for storing a plurality of profiles, each profile being produced using plural sample ink amount data selected based on an evaluation index including a color difference index and an image quality index, the color difference index representing a color difference between a sample color which is calculated from spectral reflectance of a virtual sample patch to be printed with ink amounts represented by the sample ink amount data and a comparative color which is selected as a basis for comparison, the image quality index representing image quality of the virtual sample patch, the evaluation index for the plurality of profiles being defined to have different functional forms, ~~and~~ the color difference index not being calculated from differences in the spectral reflectance of the sample color and the comparative color but rather being calculated from differences in colorimetric values of the sample color and the comparative color, the colorimetric values being either CIE-L*a*b* values or CIE-XYZ values, and the image quality index including either one of a graininess index (GI) indicating graininess of a print and an ink amount index indicating an ink usage amount; and

a color converter for selecting one of the plurality of profiles and for converting given colorimetric data into ink amount data with reference to the selected profile.

Claim 2 (Previously Presented): The apparatus according to claim 1, wherein the color difference index includes plural types of available color difference indices, and the image quality index includes plural types of available image quality indices, and

the color converter receives user selection of the color difference index and the image quality index, and selects the profile produced using the evaluation index including the selected color difference index and the selected image quality index.

Claim 3 (Previously Presented): The apparatus according to claim 1, wherein each of the color difference index and the image quality index has plural available types that are associated with a plurality of printing conditions, and

the color converter receives selection of one of the printing conditions, and selects the profile produced using the evaluation index including proper types of the color difference index and the image quality index associated with the selected printing condition.

Claim 4 (Previously Presented): The apparatus according to claim 1, wherein the plurality of profiles are associated with plural types of images to be reproduced by the ink amount data, and

the color converter receives selection of one of the plural types of images, and selects the profile associated with the selected image type.

Claim 5 (Currently Amended): An apparatus for converting colorimetric value data into ink amount data, comprising:

a first converter for receiving colorimetric value data including either CIE-L*a*b* values or CIE-XYZ values and outputting ink amount data such that two colorimetric values of a virtual sample patch to be printed with the same ink amounts represented by the ink amount data under two different viewing conditions are ~~substantially~~ equal to each other;

a second converter for receiving colorimetric value data including either CIE-L*a*b* values or CIE-XYZ values and outputting ink amount data such that the ink amounts represented by the ink amount data ~~substantially~~ reproduces spectral reflectance associated with the received colorimetric value;

a selector for selecting one of the first and second converters; and

an image processor for converting given colorimetric value data into ink amount data using the selected converter.

Claim 6 (Currently Amended): A method for performing color conversion with reference to a profile defining correspondence between colorimetric value data and ink amount data, comprising:

(a) providing a plurality of profiles, each profile being produced using plural sample ink amount data selected based on an evaluation index including a color difference index and an image quality index, the color difference index representing a color difference between a sample color which is calculated from spectral reflectance of a virtual sample patch to be printed with ink amounts represented by the sample ink amount data and a comparative color which is selected as a basis for comparison, the image quality index representing image quality of the virtual sample patch, the evaluation index for the plurality of profiles being defined to have different functional forms, ~~and~~ the color difference index not being calculated from differences in the spectral reflectance of the sample color and the comparative color but rather being calculated from differences in colorimetric values of the sample color and the comparative color, the colorimetric values being either CIE-L*a*b* values or CIE-XYZ values, and the image quality index including either one of a graininess index (GI) indicating graininess of a print and an ink amount index indicating an ink usage amount;

(b) selecting one of the plurality of profiles; and

(c) converting given colorimetric data into ink amount data with reference to the selected profile.

Claim 7 (Previously Presented): The method according to claim 6, wherein the color difference index includes plural types of available color difference indices, and the image quality index includes plural types of available image quality indices, and

the step (b) includes the steps of receiving user selection of the color difference index and the image quality index, and selecting the profile produced using the evaluation index including the selected color difference index and the selected image quality index.

Claim 8 (Previously Presented): The method according to claim 6, wherein each of the color difference index and the image quality index has plural available types that are associated with a plurality of printing conditions, and

the step (b) includes the steps of receiving selection of one of the printing conditions, and selecting the profile produced using the evaluation index including proper types of the color difference index and the image quality index associated with the selected printing condition.

Claim 9 (Previously Presented): The method according to claim 6, wherein the plurality of profiles are associated with plural types of images to be reproduced by the ink amount data, and

the step (b) includes the steps of receiving selection of one of the plural types of images, and selecting the profile associated with the selected image type.

Claim 10 (Currently Amended): A method for converting colorimetric value data into ink amount data, comprising:

(a) providing a first converter for receiving colorimetric value data including either CIE-L*a*b* values or CIE-XYZ values and outputting ink amount data such that two colorimetric values of a virtual sample patch to be printed with the same ink amounts represented by the ink amount data under two different viewing conditions are ~~substantially~~ equal to each other;

(b) providing a second converter for receiving colorimetric value data including either CIE-L*a*b* values or CIE-XYZ values and outputting ink amount data such that the ink amounts represented by the ink amount data ~~substantially~~ reproduces spectral reflectance associated with the received colorimetric value;

(c) selecting one of the first and second converters; and

(d) converting given colorimetric value data into ink amount data using the selected converter.

Claim 11 (Currently Amended): A method of producing a profile defining correspondence between colorimetric value data and ink amount data representing a set of ink amounts of plural inks usable by a printer, comprising:

(a) providing a spectral printing model converter configured to convert ink amount data to spectral reflectance of a color patch to be printed according to the ink amount data;

(b) providing a plurality of sample ink amount data each representing a set of ink amounts of plural inks;

(c) converting each sample ink amount data into spectral reflectance of a virtual sample patch to be printed with the ink amounts represented by the sample ink amount data using the spectral printing model converter;

(d) selecting one of a plurality of color difference indices and one or more of a plurality of image quality indices, each color difference index representing a color difference between a sample color which is calculated from the spectral reflectance and a comparative color which is selected as a basis for comparison, each image quality index representing image quality of the virtual sample patch to be printed according to the sample ink amount data, ~~and~~ each color difference index not being calculated from differences in the spectral reflectance of the sample color and the comparative color but rather being calculated from differences in colorimetric values of the sample color and the comparative color, the colorimetric values being either CIE-L*a*b* values or CIE-XYZ values, and each image quality index including either one of a graininess index (GI) indicating graininess of a print and an ink amount index indicating an ink usage amount;

(e) calculating values of the selected color difference index and the selected image quality index for the plurality of sample ink amount data;

(f) calculating an evaluation index using the values of the selected color difference index and the selected image quality index for the plurality of sample ink amount data;

(g) selecting plural sample ink amount data based on the evaluation index; and

(h) producing a profile defining correspondence between colorimetric value data and ink amount data based on the selected plural sample ink amount data.

Claim 12 (Currently Amended): An apparatus for producing a profile defining correspondence between colorimetric value data and ink amount data representing a set of ink amounts of plural inks usable by a printer, comprising:

a spectral printing model converter for converting ink amount data to spectral reflectance of a color patch to be printed according to the ink amount data, the spectral printing model converter converting each of a plurality of sample ink amount data into spectral reflectance of a virtual sample patch to be printed with the ink amounts represented by the sample ink amount data;

a selector for selecting one of a plurality of color difference indices and one or more of a plurality of image quality indices, each color difference index representing a color difference between a sample color which is calculated from the spectral reflectance and a comparative color which is selected as a basis for comparison, each image quality index representing image quality of the virtual sample patch to be printed according to the sample ink amount data, ~~and~~ each color difference index not being calculated from differences in the spectral reflectance of the sample color and the comparative color but rather being calculated from differences in colorimetric values of the sample color and the comparative color, the colorimetric values being either CIE-L*a*b* values or CIE-XYZ values, and each image quality index including either one of a graininess index (GI) indicating graininess of a print and an ink amount index indicating an ink usage amount;

a calculator for calculating values of the selected color difference index and the selected image quality index for the plurality of sample ink amount data;

a calculator for calculating an evaluation index using the values of the selected color difference index and the selected image quality index for the plurality of sample ink amount data;

a selector for selecting plural sample ink amount data based on the evaluation index;
and

a profile generator producing a profile defining correspondence between colorimetric value data and ink amount data based on the selected plural sample ink amount data.